CorpsLON
UMCS Requirements
UFGS 25 10 10

UMCS Requirements Overview

The following is a summary of the requirements in Unified Facilities Guide Specification (UFGS) 25 10 10:

- Not all requirements are discussed here
- Project specific requirements are specified in contract documents
- The information provided is for informational purposes only
- Where conflicts exist, the contract specification provides the definitive requirement

1.3.1 System Requirements
"Give us an Open system"

- All communication between the UMCS and building networks shall be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852
- [the UMCS] shall perform supervisory control and monitoring of a base-wide ANSI/CEA-709.1B (LonWorks) network using LonWorks Network Services (LNS) as specified and shown

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1.3.1 System Requirements
"We Own the System"

- All software used by the UMCS shall be licensed to and delivered to the installation as specified
- All necessary documentation, configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government…
- The Contractor shall provide sufficient documentation and data, including rights to documentation and data…

  such that the Government or their agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor

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Building Point of Connection
- ANSI/CEA-709.1B Gateway -

- Performs bi-directional translation to/from ANSI/CEA-709.1B to another protocol
- "Talks" ANSI/CEA-852 on the LonWorks side
  - Can pair a gateway "talking" ANSI/CEA-709.1B over TP/FT-10 with an ANSI/CEA-852 router
- Must expose points as SNVTs on the LonWorks side
- Allowed ONLY for the integration of legacy systems

Building Point of Connection
ANSI/CEA-709.1B TP/FT-10 to IP Router

- Connects TP/FT-10 network to IP network
- Communicates over IP network per ANSI/CEA-852
- Must supports use of ANSI/CEA-852 configuration server but must also be manually configurable
  - Spec revision will clarify via a console (serial) port
- Primary connection between building control network and UMCS network

Monitoring and Control (M&C) Software

- Broken down into functions:
  - System Graphic Displays/Graphical User Interface (GUI)
  - Scheduling
  - Alarm Generation and Alarm Handling
  - Trending
  - Demand Limiting
  - Programming Language
  - Report Generation

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M&C Software -Permissions-

- Current spec: must support at least 4 levels:
  - Level 1: View System Graphic Displays
  - Level 2: Ack alarms, set up (configure) trends & reports
  - Level 3: Override points and set up (configure) alarms, schedules, and demand limiting
  - Level 4: Create and modify System Graphic Displays
- Revised spec: must support at least 5 levels
  - Level 3 is override of controller outputs
  - New level 4: Override of controller inputs
  - Current Level 4 becomes level 5

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M&C Software
-Permissions-

- User information (designer option):
  - Obtained from operating system

  or
  - Managed by M&C software

  or
  - Let the contractor decide
- Common Access Card (CAC) enabled login would be beneficial

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M&C Software
-Scheduling-

- M&C Software is the primary scheduler
- Must be able to schedule any SNVT
- Most schedules are for the *Scheduled Occupancy Input* of a system scheduler
- Revised spec will add a requirement for all schedules to be *reinforced* (resent at a regular interval and when the system starts)
  - Needed for “timeout” at system scheduler
  - Prevents missing schedules completely due to server or network being down

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M&C Software
-Alarm Generation-

- The M&C Software polls the network to obtain point values and determines if an alarm condition exists
  - If current spec is followed this is rarely, if ever, used
  - Current spec not often followed in practice
- Revised spec uses M&C software as primary alarm generation

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M&C Software
-Alarm Handling-

- Provide alarm notification via:
  - Email
  - Pager
  - A pop-up on a workstation (GUI) display
  - Printer
- Alarm destination shown on Alarm Routing Schedule drawing
- Log all alarms
- Handling and management of no less than [10,000] alarm points

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M&C Software
-Alarm Priorities-

- 2 Alarm priorities:
  - Critical alarms are cleared when acknowledged by an operator and the alarm condition no longer exists
  - Informational alarms are cleared when acknowledged by an operator or the alarm condition no longer exists
- Cleared alarms remain in alarm log
- Alarm priority shown on the Point Schedule

M&C Software
-Trending-

- M&C Software does trending
- Sampling interval:
  - min sampling interval no greater than 1 second
  - max sampling interval no less than 1 hour
- Minimum trending capacity: 100 points per second
- Trends to be set up by UMCS Contractor indicated on Points Schedule

M&C Software
-Demand Limiting-

- Current spec: Relatively detailed requirements
- Revised spec: simplified requirements:
  - Change the occupancy mode or setpoint of HVAC equipment based on a projected demand to maintain demand below a configured target
  - Option: Target shall incorporate real-time pricing data
  - The demand limiting algorithm shall incorporate priority levels such that low priority equipment is turned off before high-priority equipment
  - The demand limiting algorithm shall generate a critical alarm when it begins to impact the system and also if the demand target is exceeded

M&C Software
-Programming Language-

- Current spec: M&C Software must support custom programming
- Revised spec: Due to lack of support, requirement for custom programming capability may be removed

M&C Software
-Clients-

- Current Spec: Client type unspecified
  - Full Client
  - Light Client
  - Web Client
- Strongly considering requiring web clients in revised specs (any objections?)

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Network Configuration Tool

- Network Configuration Tool provided by UMCS Contractor to have 1 standard for installation
- LNS Network Configuration Tool
- Capable of running LNS Plug-ins
- “Graphical” – this may not mean what you think
- Can recreate (“discover”) network
- Can add/merge databases
- Considering allowing discovery and merge tools to be separate software in revised specs

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UMCS Network Bandwidth Calculations

- Contractor performs calculations for a “normally” and “heavily” loaded UMCS
- “Normally Loaded” and “Heavily Loaded” defined in the spec
- Important for coordination with the DOIM for use of IP network

Building Control Network Bandwidth Calculations

- Not in current spec – added by current revisions
- Contractor performs calculations for “normal” and “heavy” traffic between the building and the UMCS
- Calculations performed from perspective of Building Control Network Backbone
- If bandwidth usage too high, split BCN Backbone and use multiple BPOCs

Integration of BCN

- Install BPOC
- Add/merge BCN LNS database into UMCS LNS database (if appropriate)
- Reconfigure Local Display Panels
- Set up all graphic displays, alarms, trends etc.

Testing

- Factory Test
- Start-Up and Start-Up Testing: Contractor starts and tests the system
- Performance Verification Test (PVT):
  - Phase I: Test system with Government
  - Phase II: Operate system during Basic Operator Training

Training

- Three training courses:
  - Basic Operator Training
  - Advanced Operator Training
  - Operator Refresher Training

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Project Sequencing

- *(Submittal)* Factory test procedures
- *(Execute)* Perform factory test
- *(Submittal)* Factory test report
- *(Submittal)* Existing conditions report, design drawings, product datasheets, network bandwidth calculations, pre-construction QC checklist
- *(Execute)* Install UMCS
- *(Execute)* Start up and start up testing
- *(Submittal)* Post-construction QC checklist, computer software, startup and startup testing reports, draft as-built drawings
- *(Submittal)* PVT phase I procedures

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Project Sequencing

- *(Execute)* PVT phase I
- *(Submittal)* PVT phase I report
- *(Submittal)* Preventative maintenance work plan, O&M manuals
- *(Submittal)* Basic operator training materials
- *(Execute)* Basic operator training (Phase II PVT)
- *(Submittal)* PVT phase II report
- *(Submittal)* Final as-builts
- *(Submittal)* Advanced operator training materials
- *(Execute)* Advanced operator training
- *(Submittal)* Operator refresher training materials
- *(Execute)* Operator refresher training
- *(Submittal)* Closeout QC checklist

QC Checklists

(combined pre-, construction-, and final-)

- UMCS network bandwidth calculations
- Design riser with location/types of BPOCs
- M&C is LNS based and uses LNS for 709.1 networks
- Connection between IP and 709.1 via 852 routers
- Computer workstations and servers per riser diagram
- Training schedule and attendees coordinated with DPW
- LNS database up to date and accurately reflects system

QC Checklists

(combined pre-, construction-, and final-)

- All software licensed to government
- M&C software displays created for all systems
  - all points/graphics including overrides per Points Schedule
- Accurate as-builts
- Default trends per Points Schedule
- Schedules set up per Occupancy Schedule
- O&M instructions submitted
- Basic and Advanced Operator training finished